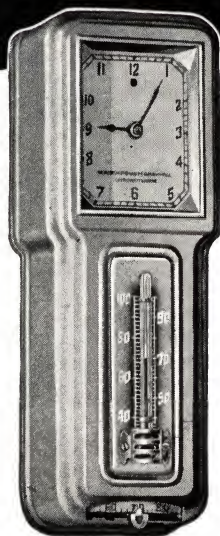


AUTOMATIC CONTROL SYSTEMS FOR HEATING, VENTILATING AND AIR CONDITIONING



MINNEAPOLIS-HONEYWELL



WHEREVER YOU ARE, from coast to coast, Minneapolis-Honeywell offers you its services and advice on automatic control systems for heating, ventilating and air conditioning. Minneapolis-Honeywell is in a position to furnish control systems for schools, homes, hospitals, commercial buildings, theatres, factories, office buildings—in fact for any application, large or small, new or old. Whether you desire control for an oil, coal or gas burner type of installation—a zone control installation, a ventilating system, or a complete air conditioning system, Minneapolis-Honeywell is equipped to serve you. The following pages have been prepared for the primary purpose of assisting you with your heating, ventilating and air conditioning problems. A competent M-H control engineer is always ready to work with you. He is as close as your phone.

AUTOMATIC CONTROL IS ESSENTIAL

Automatic control of heating, ventilating and air conditioning provides:

COMFORT—room temperature properly maintained.

HEALTH—no sudden changes of temperature.

SAFETY—all parts of heating plant properly safeguarded.

ECONOMY—saving of fuel and labor costs.

CONVENIENCE—no manual attention necessary.

In addition, complete automatic control will:

- Help to promote complete customer satisfaction.
- Help to lower operating and maintenance cost.
- Cost less if installed when building is erected, or remodeled.

STANDARDIZE ON M-H CONTROLS

1. Minneapolis-Honeywell offers you unified responsibility.

Minneapolis-Honeywell has the right control for every application—a complete service. From this single organization an architect can obtain every instrument known to the control field—electric, pneumatic or a combination of the two. Controls and control systems for bungalows or skyscrapers—from boiler room to radiator!

Minneapolis-Honeywell, through its Brown Instrument Division, also offers a complete line of recording, indicating and controlling instruments.

2. Minneapolis-Honeywell offers you a competent nation-wide engineering and service organization.

Minneapolis-Honeywell branch offices and distributors are conveniently located in over eighty cities throughout the country, and each is equipped to make complete installation of control systems on heating or air conditioning installations. Thoroughly trained men are available to recommend control sequence which will provide the desired results.

3. Minneapolis-Honeywell offers you the benefit of years of experience in every branch of the control industry.

Fifty years of experience in the field of electric controls for all types of buildings and residences, large or small!

Seventy-five years of experience in the field of indicating, recording and controlling instruments!

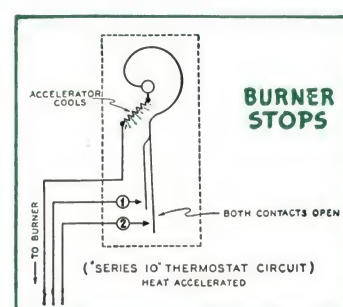
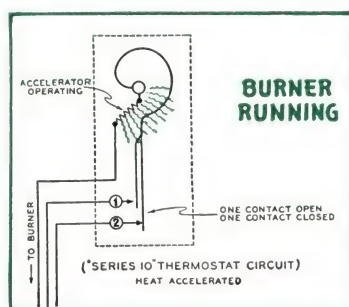
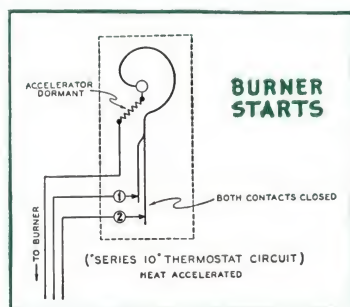
Thirty-five years of experience in the field of pneumatic control for commercial buildings, and large homes!

AUTOMATIC CONTROL SYSTEMS

The popularity of Automatic Residential Heating Plants is based on a desire for the high degree of comfort, convenience and economy which has been made possible only through Automatic Control.

The Controls supplied as standard equipment for oil burners, gas burners and coal stokers—the thermostat, the limit control and the burner relay or valve—represent the simplest type of Automatic Control. They are the nucleus on which to build complete control systems that will achieve new levels of comfort, convenience and economy.

THE ACRATHERM has "heat acceleration"



THE ACRATHERM is a standard M-H "series 10" thermostat to which a medium for producing internal heat has been added. This heater element, or "accelerator," provides a means for maintaining stabilized temperatures, regardless of variations in outside weather.

By introducing artificial heat in the thermostat itself at the first indication of a room temperature rise, the "accelerator" serves to stimulate the action of the bi-metal element, thus preventing overheating, as well as "cold 70."

The room temperature must rise before artificial heat is applied to the thermostat, and the possibility of false shut down of the burner is completely eliminated.

In the "heat accelerated" Acratherm the elements of temperature and time are scientifically combined. Temperature drop starts the burner, temperature rise (both in fractional degrees) actuates the accelerator, and the adjustable differential in the Acratherm determines the time necessary for proper heat distribution throughout the space served.



LOWERED NIGHT TEMPERATURE provides economy . . .

Lowered night temperatures under automatic control mean fuel savings . . . warm rooms in which to dress . . . and actually 200 hours of additional sleep each year.

The M-H CHRONOTHERM automatically lowers the temperature control point at night and automatically restores it at some predetermined morning hour.

The resultant savings, as computed by the following formula, frequently provide sufficient savings to pay for the Chronotherm installation during the first heating season.

$$\text{Percentage of saving} = \frac{A-B}{A-C} \times \frac{D}{24}$$

A = Normal inside day temperature level.

B = lowered inside night temperature level.

C = average outside temperature level.

D = hours of night shutdown.

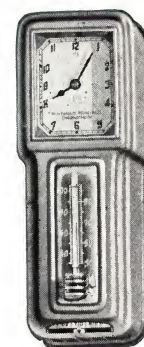
If complete automatic clock action is not desired, M-H recommends the Da-Nite Acratherm with which temperatures may be lowered at night by a slight manual adjustment and automatically raised at any selected morning hour.

FOR RESIDENTIAL HEATING

THE CHRONOTHERM also includes the feature of "Heat Acceleration" and provides lowered night temperatures automatically with no manual attention required. The Chronotherm not only automatically lowers the temperature, but also returns it to the normal level at a predetermined morning hour. These functions are repeated every day without manual attention. The Chronotherm is equipped with a telechron electric clock of the synchronous self-starting type.



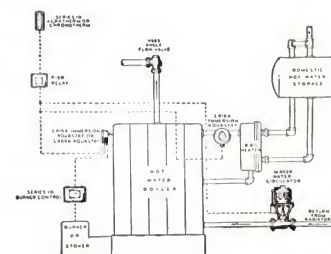
THE DA-NITE ACRATHERM includes the "Heat Acceleration" feature of the Acratherm, and in addition provides lowered night temperatures by a simple "twist of the wrist." Return to normal temperature at any predetermined time is fully automatic. The Da-Nite Acratherm is equipped with a black setting wheel and winding knob—both on the same shaft—presenting the simplest of adjustment features and eliminating the necessity of arithmetical calculations.



YEAR 'ROUND HOT WATER *from the automatic burner*

Every automatically fired steam or hot water boiler, equipped with an indirect heater, can furnish a plentiful supply of domestic hot water at low cost, all the year around, in summer as well as in winter, with a Minneapolis-Honeywell summer-winter control system. Consider these advantages of a summer-winter hot-water control system:

1. Plentiful supply of low cost hot water.
2. Year around, 100% use of investment.
3. Constant use prevents boiler and burner deterioration.
4. Summer use prevents basement dampness.



The illustration at the right clearly shows how simple it is to install a summer-winter domestic hot water system. For particulars consult a Minneapolis-Honeywell engineer.

LO-WATER CUTOFF . . . *safety control for steam or vapor systems*



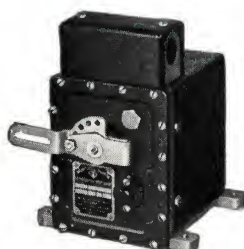
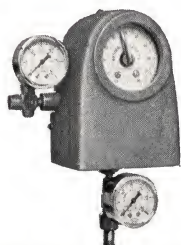
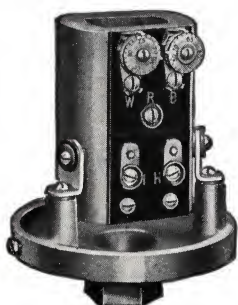
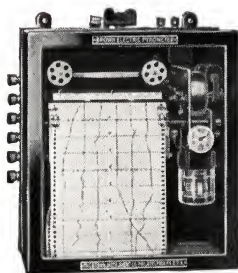
Steam and vapor systems are subject to numerous hazards which may result in serious damage due to firing a dry boiler. Defective and leaking castings, pipes, joints or fittings, clogged water heaters, or other defects are all too common causes of low water danger. In many localities ordinances exist which prevent the installation of a steam or vapor system without a low-water cutoff or its equivalent. Minneapolis-Honeywell Lo-Water Cutoffs remove these dangers by shutting off the heat supply in the event the water gets too low for safe operation.

The Lo-Water Cutoff or Duplexswitch meets all A.S.M.F. boiler code regulations, and is readily installed, as it utilizes a gauge glass opening.

RESIDENTIAL ZONE CONTROL *for larger homes*

In homes with servant quarters, guest rooms, garage or other sections, which do not all require the same temperature at the same time, control from one thermostat is not satisfactory from the standpoint of comfort and economy. The rooms of a home ordinarily occupied should be kept at 70 or 72°, the garage just above freezing, the servants' quarters should be kept cool during the hours when they are not in use, and so on. To accomplish these results, the heating system should be divided into sections and controlled under a system of space heating. Each building may be divided into suitable zones, based on exposure, occupancy and time requirements, so that the delivery of heat is adjusted to the demands of each zone. The saving in fuel which can be accomplished through zone control is obvious.

AUTOMATIC CONTROLS and CONTROL SYSTEMS for . . .

ELECTRIC
MODUTROL MOTORPNEUMATIC SUBMASTER
INSERTION THERMOSTATTHE WEATHERSTAT
WITH COVER REMOVED

RECORDING PYROMETER

MINNEAPOLIS-HONEYWELL HAS THE RIGHT
CONTROL FOR EVERY APPLICATION

"What type of control system should be used on an air conditioning installation?"

Obviously there can be no universal answer to this question since there is no specific type of control or control system which is sufficiently comprehensive to be suited to all installations.

In line with its long established policy—the right control for each application—the Minneapolis-Honeywell Regulator Company offers to the heating, ventilating, and air conditioning industry a full range of automatic controls, control systems, and industrial instruments specifically designed to meet the most exacting requirements of the industry.

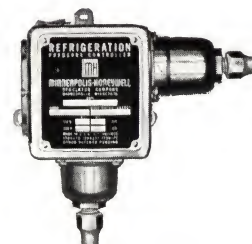
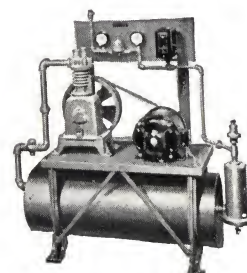
Over fifty years of careful planning and research have enabled Minneapolis-Honeywell to contribute many revolutionary developments to the field of temperature control including: Clock Thermostat Control with its advantages of lowered night temperature; the use of Limiting Devices for safeguarding a heating plant against excessive temperatures or pressures; Safety Devices for oil burners; "SERIES 10" with the exclusive feature of "Heat Acceleration"; True Modulation as offered by M-H proportioning instruments and the exclusive Series 90 circuit providing REAL flexibility in the control of air conditioning and commercial space heating.

Through the Brown Instrument Division, Minneapolis-Honeywell offers a complete line of indicating, recording, and controlling instruments for all applications. The recent addition of the National System of Pneumatic Control rounds out the program of establishing a COMPLETE control service. Over thirty-five years of experience in the field of air operated controls has enabled the National Division to develop such outstanding features as HELMET SEAL protection with the totally enclosed tamper-proof and dust-proof thermostat design; and the exclusive METAPHRAM construction providing an air tight metal-to-metal seal for all air operated valves and damper motors.

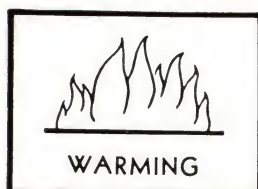
These are but a few of the features which, coupled with the ability of Minneapolis-Honeywell to accept complete responsibility for all phases of automatic control, assure you of—*The Right Control for Every Application.*



PNEUMATIC VALVE

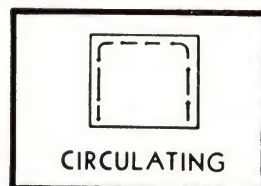
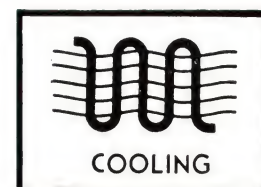
ELECTRIC
HUMIDITY CONTROLLERREFRIGERATION
PRESSURE
CONTROLLERPNEUMATIC
COMPRESSOR

COMMERCIAL HEATING AND AIR CONDITIONING



TRUE AIR CONDITIONING PROVIDES SIX IMPORTANT FUNCTIONS, ALL OF WHICH MUST BE UNDER AUTOMATIC CONTROL

Only by controlling all six factors is it possible to obtain true air conditioning. Without simultaneous automatic control, these various functions may often be in conflict, and true air conditioning becomes impossible. Your client rightfully expects all of the advantages that you have made possible in the design of his system. With a complete Minneapolis-Honeywell air conditioning control system you can be assured of maximum performance and complete coordination of all the design features.



WINTER AIR CONDITIONING

The winter air conditioning cycle provides for the heating, humidifying, cleaning and distributing of air to all conditioned spaces. Automatic control is essential to the coordination of these functions. In order to assist you in analyzing the adequacy of any automatic control system, we are listing a few typical questions, the answers to which should be given careful consideration in writing air conditioning specifications.

1. Will the system take full advantage of outside air in mild weather?

The necessity of admitting outside air for ventilation purposes gives rise to problems which can be solved only by automatic control. The control system should permit the use of more than the minimum quantity of outside air when weather is mild, and should provide a means of proportioning the amount of outside air used in accordance with inside conditions.

2. Will the system expose the heating surface to the danger of freezing?

Any coil only partially filled with steam is in danger of freezing if it is subjected to outside air at a temperature of 32° or lower. Proper control will minimize this danger.

3. Will the system provide winter cooling?

The effect of solar radiation on exposed surfaces and such internal influences as light load, changing occupancy load, etc., frequently provides a definite need for cooling, even during the winter heating cycle. Under such conditions, outside air properly proportioned by automatic control will provide an economical cooling medium.

4. Will the system operate with maximum economy?

A carefully planned sequence of automatic control prevents

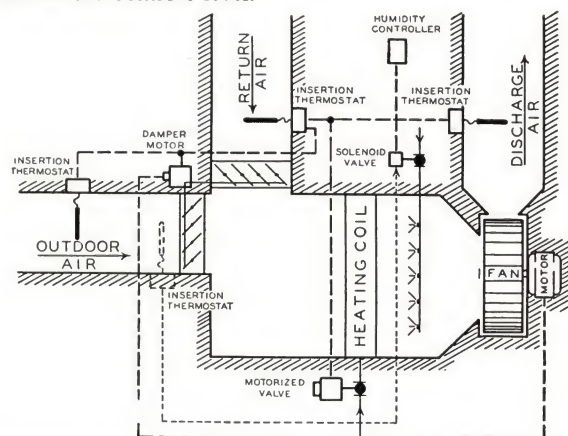
wasteful and unnecessary operation of the air conditioning equipment and insures maximum economy.

5. Will condensation and frosting on windows and walls be prevented?

To prevent moisture condensation on windows and other exposed surfaces, it is necessary to lower the inside relative humidity control point as outside temperatures drop. A Minneapolis-Honeywell engineer can specify a system to accomplish this function automatically.

6. Will the system cause discomfort due to low discharge temperatures?

A low limit temperature controller installed in the fan discharge will prevent the circulation of air at temperatures below the comfort level.



The above diagram illustrates a heating and ventilating central fan air conditioning system. The control system is designed to use a minimum amount of outdoor air when heating, although when cooling is required, this amount is increased. Minneapolis-Honeywell has prepared a group of standard control systems that cover the common arrangement of these controls. Ask for and specify these systems. Many different control systems can be designed for the same job but there is only one system that will be best from the standpoint of operation and economy.

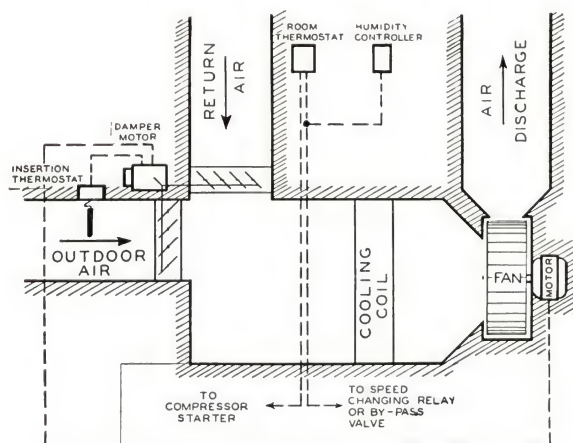
SUMMER AIR CONDITIONING

During the summer air conditioning cycle the air must be cooled, dehumidified, cleaned and circulated. In establishing and maintaining a proper relationship between these factors, automatic control offers the assurance of continued efficiency and satisfaction.

Here are a few typical questions that should be considered when specifying an air conditioning system for summer cooling.

1. Is the system controlled to maintain optimum comfort conditions or an arbitrary temperature level?

Control from a single thermostat may give a constant dry bulb temperature without providing a constant comfort condition. The American Society of Heating & Ventilating Engineers, after exhaustive tests, has published data showing that the sensation of comfort does not follow constant temperature alone, but varies also with relative humidity and air motion. These tests show further that the feeling of comfort during the cooling cycle will vary with outside temperatures. It becomes necessary therefore to automatically re-adjust inside temperature control schedules in response to fluctuations of inside relative humidity and outside dry bulb temperatures. Minneapolis-Honeywell offers as standard equipment, control units to accomplish these functions. The relation between inside and outside temperature schedules may be set at any ratio desired, depending upon the type of building, duration of occupancy, and geographical location.



The above illustrates a direct expansion central fan system for cooling. The compressor is controlled by a thermostat and a relative humidity control which operates to effect a change in coil temperature, and a change in the ratio of sensible latent heat removal. Upon demand for cooling, the compressor operates at low speed or on a single stage, but if the humidity rises too high, or upon a call for additional sensible cooling from the thermostat, the controls operate to shift the compressor to the high speed in order to operate at greatest capacity and lowest coil temperature.

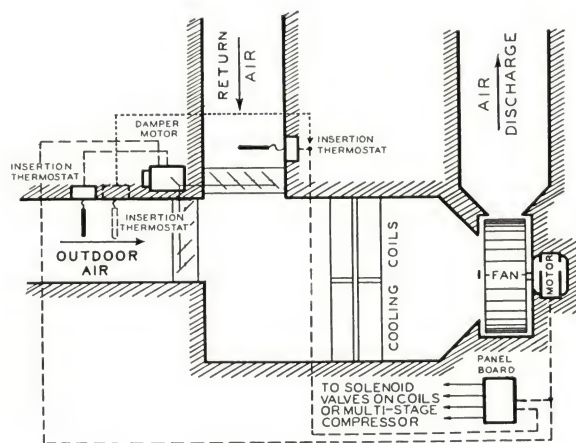
2. Will the system take advantage of outside air when conditions are favorable?

At night and during the intermediate seasons, outdoor air will frequently be available at temperatures which will permit its use directly for cooling purposes. A well designed temperature control system will take advantage of this condition and will consequently effect a marked reduction in operating cost.

3. Will your client get the most out of the system you design?

Without Automatic Control it is impossible to get the most out of any air conditioning system. The design of modern equipment provides inherent means for accurate regulation of factors which in the past have been neglected entirely, or left to chance. Precision control makes it possible to utilize engineering developments to their greatest advantage.

The Minneapolis-Honeywell control engineer in your locality is thoroughly qualified to analyze the equipment which you have specified and recommend the right system of control. The Minneapolis-Honeywell Regulator Company has prepared a number of standard systems of control. These standard systems are designed to provide dependable operation at a minimum installation and maintenance cost. Following are illustrations of two of these standard systems. If your arrangement is different, there is an M-H SYSTEM for you.



The above diagram illustrates a central fan conditioner, using a bank of four direct expansion coils for cooling. The coils are brought on in sequence as the cooling requirements of the space increase. The outdoor damper remains closed to a minimum except when outdoor air can be used for cooling. This system is also used for the control of multi-stage compressors, in which event a circuit is provided which protects the compressor motors in the event of power failure.

ALL-YEAR SYSTEMS

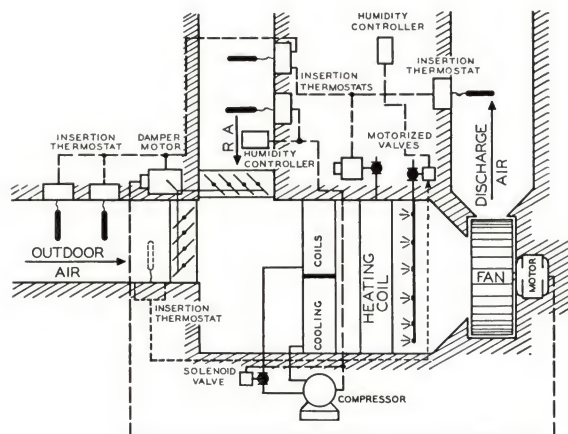
The all-year system combines the functions of both summer air conditioning and winter air conditioning, and in so doing gives rise to specific problems in the control of the system. These problems must be carefully considered when the system is designed.

1. Will the system provide automatic change-over from cooling to heating cycles?

Too frequently the change-over from cooling to heating, or from heating to cooling requires somewhat complicated manual changes and adjustments. In the modern air conditioning system, such methods are not tolerable. During the in-between seasons of the year, spring and fall, the system may be required to operate one day on the heating cycle and the next day on the cooling cycle. Very frequently such changes may be necessary several times during a single day's operation. Where many complicated changes in adjustment must be made manually, dissatisfaction will result.

The Minneapolis-Honeywell Regulator Company has made available standard systems of control which are applicable to the type of air conditioning system which you are designing. All of these standard systems provide changeover from the heating to the cooling cycle as an automatic function requiring no manual attention whatsoever. Thus the owner of the system is assured continuous comfort conditions throughout the year.

Shown below is one example of a Minneapolis-Honeywell standard control system for all-year operation. For an automatic control system designed to take care of your particular air conditioning layout, consult your Minneapolis-Honeywell engineer.



The above diagram illustrates a year-round central fan conditioning system using direct expansion refrigeration for cooling and operating as a warm air system in winter. The system provides for completely automatic changeover between heating and cooling cycles. On either the heating or cooling cycles, the system provides for taking full advantage of all the economies available in the operation of the system, and provides within the limits of the system, independent control of both temperature and humidity, summer and winter.

COMMERCIAL SPACE HEATING

The advantages of CENTRALIZED RESPONSIBILITY for the design, installation and maintenance of commercial space heating control and temperature indication systems cannot be over-emphasized.

It is certain that control as it enters into any part of the building or its mechanical equipment should be the

responsibility of a single manufacturer, if confusion is to be avoided and your client's interests protected.

Minneapolis-Honeywell offers to accept the entire responsibility for the controls and instruments to be used in any building that you design.

UNIT VENTILATORS

The unit ventilator which is a self-contained unit provides the functions of heating, cleaning, and ventilating, and presents a very definite control problem. These functions must be coordinated to provide uniform temperatures and necessary ventilation.

Minneapolis-Honeywell can provide either PNEUMATIC or ELECTRIC systems of control for unit

ventilators and has had wide experience in the use of both types. The size and type of installation determines which system of control will be preferable for any particular job. Minneapolis-Honeywell is in a position to exercise unbiased judgment in recommending automatic controls or control systems for unit ventilator installations.

UNIT HEATERS

Unit heaters may be controlled individually or in multiple groups when several are arranged to serve a limited area.

In its simplest form, a unit heater control system will provide a line voltage room type thermostat which will start and stop the unit heater fan motors. Since steam is usually supplied to the units intermittently, special precautions must be taken to prevent the fan motors from operation when the coils are not sufficiently warm to insure against the discharge of cold air. A specially designed limit control should be mounted on the return pipe of the unit heater or strapped on the face of the heater itself to keep the fan motor inoperative until the coil has warmed up to a predetermined minimum temperature.

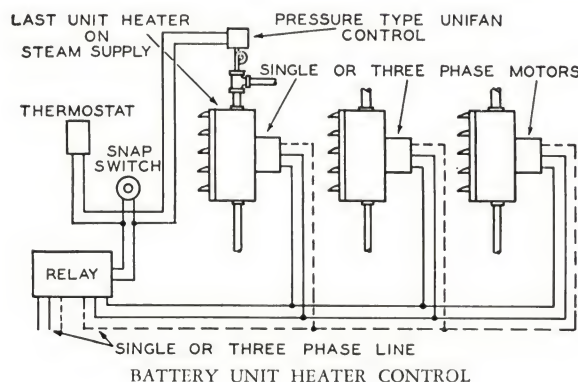
Line voltage controls will provide extremely satisfactory results when control operation, within narrow temperature differentials, is not essential.

A more accurate means of control utilizes the Minneapolis-Honeywell Acratherm operating in conjunction with a "series 10" relay. This system takes advantage of the "Heat Accelerating" feature of the Acratherm and should be used where precise control is desired.

As in the case of the line voltage thermostat application, a low limit controller should be used where the possibility of steam failure exists.

Unit heaters may be grouped to provide zone control. Each zone should be placed under the command of one or more thermostats with the necessary limit controls and relays as dictated by the needs of the individual zone.

The flexibility of Minneapolis-Honeywell controls makes them readily adaptable to all types of unit heater installations.



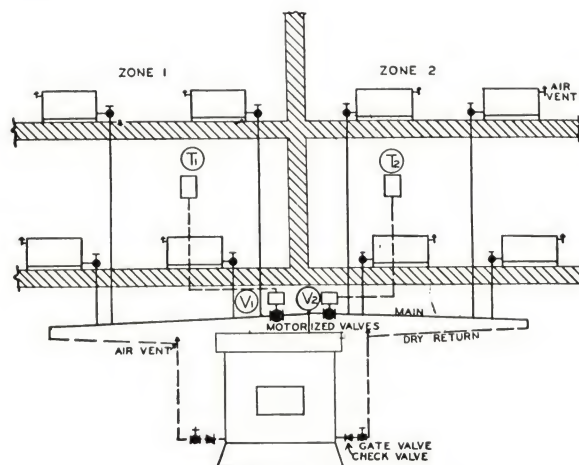
ZONE CONTROL

It must be understood that there are definite limitations to the use of a single thermostat for complete building temperature control. Obviously, the thermostat is sensitive to fluctuations in temperature, only at the position of its location. A single thermostat can be effectively applied in the small residence since it is not difficult to select a representative mounting location. In larger residences and in commercial buildings, however, it is usually impossible to find a location for a single thermostat that will give an average measurement of temperatures throughout the building.

Overheating and underheating with their consequent discomfort and fuel waste are the natural results of an attempt to control a large space under these conditions.

Whether the heating system be warm air, hot water, or steam, it should be zoned and the zones placed under the control of separate thermostats.

The problem of zoning should be kept in mind when the heating system is designed. In larger buildings where steam is ordinarily used for heating, the piping layout must be such that the building can be effectively divided from the following standpoint: type of occupancy, hours of occupancy, exposure, and construction. Motorized steam valves may be installed in each zone



The above diagram illustrates a simple one-pipe up-feed steam system with two zones.

and controlled by individual room thermostats. However, a preferable system of control, where the zones are large, will make use of the Weatherstat to control these motorized steam valves.

Individual radiator control can be used to provide even more uniform temperature. The MODUSTAT, a self-contained radiator valve, has been specifically designed to directly control the admission of steam to each radiator in the system in accordance with room temperatures.

THE WEATHERSTAT

The Weatherstat is the controlling element for a complete system of automatic temperature regulation for large buildings.

The Weatherstat meters the input of heat to a building in accordance with the heat losses from that building. The instrument itself is actually a miniature enclosure or tiny room mounted on the outside of a building so that it may be affected by the same factors of heat loss that affect the building—outdoor temperature, wind direction, wind velocity, and solar radiation. Heat is supplied to the Weatherstat through an electric heater element and maintains the instrument at the same temperature level as is required within the building.

As outside weather conditions produce varying degrees of heat loss from the building, the Weatherstat, being subjected to the same conditions, calls for more or less electrical heat for itself and at the same time automatically controls the heat input to the building. In this manner the building heat is controlled in accordance with all outside weather fluctuations.

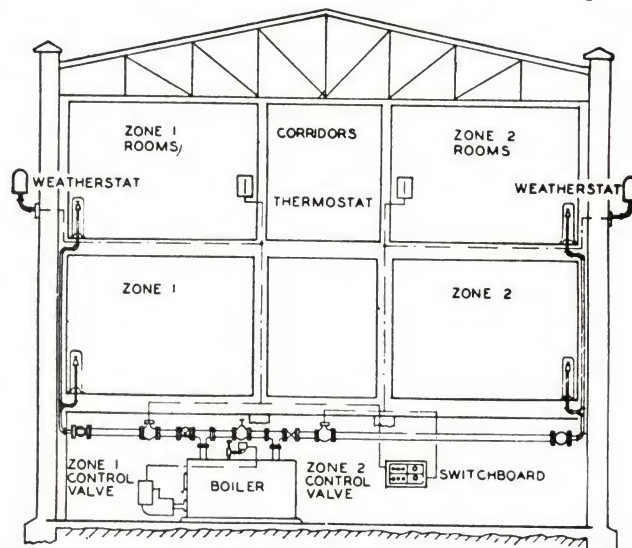
The Weatherstat is the logical control for large or small buildings where, due to construction, occupancy, or interior arrangement, thermostat control is neither practical nor applicable.

COMBUSTION CONTROL

The burning of fuels, such as oil or gas, requires that automatic controls be used to: (1) guard against unforeseen hazards; (2) provide an automatic program of starting, and (3) protect against flame failure.

Maximum boiler efficiency with any type of fuel can be obtained only with automatic combustion regulation. Combustion regulation may be compared to the adjustment of the common automobile carburetor. In the latter, however, the improper mixing of fuel and

The Minneapolis-Honeywell System of Weatherstat Control will automatically maintain the temperature level desired throughout the entire building at all hours and definitely effect a major saving in fuel consumption.



The above diagram shows a typical two zone Weatherstat installation, including a Weatherstat, a night low limit thermostat and a zone valve for each zone, with the terminal switch board shown in the basement. On this particular installation the boiler would be held at a constant pressure or temperature by means of a Pressuretrol controlling a primary burner control.

air shows up at once in inefficient operation of the engine and warns the owner instantly; while a boiler does not indicate such lack of efficiency until added fuel costs become apparent.

Protect your clients' interests by specifying:

1. Minneapolis-Honeywell Combustion Controls to guard against hazard.
2. A complete system of Combustion Regulation to insure economy.

BROWN INSTRUMENTS for Indicating, Recording, Controlling

Brown Instruments are manufactured by the Brown Instrument Division of the MINNEAPOLIS-HONEYWELL REGULATOR COMPANY.

1. Indicating and Recording Room Temperature.

A Brown recording resistance thermometer provides a continuous chart record of temperatures throughout the building. The Brown indicating resistance thermometer provides for taking instantaneous readings of temperatures at any required number of points throughout a building. The installation of such equipment gives the engineer a means of keeping a constant check on temperature conditions throughout the building, preventing complaints of occupants and making possible definite economies in operation.

2. Boiler Room Instruments

Brown Instruments for recording and indicating steam flow pressures, stack temperatures, draft pressures and CO₂ content of flue gas, are indispensable to the modern operating engineer. The gain in efficiency of boiler operation that results from the use of a carefully planned system of instrumentation is generally recognized.

The careful choice of instruments for the boiler room at the

time the building is designed will assure the client efficient and economical operation for years to come, and a positive record of these economies will be instantly available.

3. Indicating and Recording Instruments for Air Conditioning.

Modern air conditioning requires modern methods of evaluating the efficiency of operation. Indicating or recording instruments should be used to give a continuous record of room temperatures and humidity, in order to assure comfort conditions and to forestall complaints. Recording and indicating instruments should be used to measure dry bulb and wet bulb temperatures in the outside air, return air and supply air, giving a continuous measure of the operation of the system. Flow meters and flow records can be used to measure water consumption and steam consumption to prevent the occurrence of waste.

BROWN INSTRUMENTS INCLUDE

Thermometers	Pyrometers
Pressure Gauges	Flow Meters
Vacuum Gauges	CO ₂ Meters
Potentiometers	Micrometers
Liquid Level Gauges	

ENGINEERING SERVICE ON MINNEAPOLIS-HONEYWELL AND NATIONAL CONTROL SYSTEMS AND BROWN INDICATING AND RECORDING INSTRUMENTS IS AVAILABLE AT ALL OFFICES

MINNEAPOLIS - HONEYWELL REGULATOR COMPANY

GENERAL OFFICES AND MAIN PLANT - 2771 FOURTH AVENUE, MINNEAPOLIS, MINNESOTA.
RESEARCH DIVISION AND PLANT, WABASH, INDIANA

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AND CONTROL SYSTEMS, NATIONAL AUTOMATIC CONTROLS AND CONTROL SYSTEMS AND
BROWN INDUSTRIAL INSTRUMENTS

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